

BEGIN REEL
#423

PETUKHOV, A.G-

PETUKHOV, A.G.

Tentative Production-Technical Specifications on Exposure Measurements.
LONII Aeros"yanki (1933)

PETUKHOV, A. G.

"A Project for a Temporary Promotion and Technical Instruction in Aerial
Explanometry by the Leningrad Oblast Scientific-Research Institute of Aerial
Survey", 1955.

VASIL'YEV, S.I., inzh.; 117 KBR, 117, 117.

Improving the performance of the
980-981 N 14.

"APPROVED FOR RELEASE: 06/15/2000

CIA-RDP86-00513R001240710001-5

APPROVED FOR RELEASE: 06/15/2000

CIA-RDP86-00513R001240710001-5"

PETUKHOV, A.P., student

Influence of the pain stimulus on the flexor reflex and its inhibition
in frogs. Trudy Izhev.gos.med.inst. 13:477-481 '51. (MIRA 13:2)

1. Kafedra fiziologii Izhevskogo meditsinskogo instituta. Zaveduyushchiy
kafedroy - prof. Yu.P. Fedotov.
(REFLEXES) (PAIN)

PETUKHOV, A.S., ved. red.

[Basis for presenting the oil and gas resources of North America on the basis of the correlation of regional geologic data; direct of foreign literature. Obosnovanie promyslov neftepromyshlennosti Severnoi Ameriki po materialam regional'nogo geologicheskogo spetsializatsionnogo literaturny. Moscow, 1963. 31 p. (USSR 11:1)

1. Petrov, A.S. Informatsionno-issledovatel'skiy institut informatsii i tekhniko-ekonomicheskikh issledovaniy po neftepromyshlennosti.

KUPALOV-YAROPOLK, I.K.[translator]; PETUKHOV, A.S., red.

[Collected translations; novelties in geophysical instrument design] Sbornik perevodov; novinki geofizicheskogo priborostroeniia. Moskva, 1962. 23 p. (MIRA 17:4)

1. Moscow. Institut tekhnicheskoy informatsii i ekonomicheskikh issledovaniy po neftyanoy i gazovoy promyshlennosti.

GORBACHEV, I.F.; PETUKHOV, A.V.; TIMOFEEV, A.A.

Geology of the Zeya-Bureya Plain. Neftyan. Zhurn. 1965. No. 1:
17-21 '65.

1. Trest "Vostsibneftegeofizika".

12111-01V, A.V., Gane less Sci -- (11) "Study of the
productive efficiency of tractor with a ~~teless~~
~~transmission case~~." Nov. 1957, 10 pp. with graphs (Win
of Agr. Univ. of ~~Exhibition~~, ~~1958~~ ~~1957~~ ~~1958~~ ~~1959~~ ~~1960~~ ~~1961~~ ~~1962~~ ~~1963~~ ~~1964~~ ~~1965~~ ~~1966~~ ~~1967~~ ~~1968~~ ~~1969~~ ~~1970~~ ~~1971~~ ~~1972~~ ~~1973~~ ~~1974~~ ~~1975~~ ~~1976~~ ~~1977~~ ~~1978~~ ~~1979~~ ~~1980~~ ~~1981~~ ~~1982~~ ~~1983~~ ~~1984~~ ~~1985~~ ~~1986~~ ~~1987~~ ~~1988~~ ~~1989~~ ~~1990~~ ~~1991~~ ~~1992~~ ~~1993~~ ~~1994~~ ~~1995~~ ~~1996~~ ~~1997~~ ~~1998~~ ~~1999~~ ~~2000~~ ~~2001~~ ~~2002~~ ~~2003~~ ~~2004~~ ~~2005~~ ~~2006~~ ~~2007~~ ~~2008~~ ~~2009~~ ~~2010~~ ~~2011~~ ~~2012~~ ~~2013~~ ~~2014~~ ~~2015~~ ~~2016~~ ~~2017~~ ~~2018~~ ~~2019~~ ~~2020~~ ~~2021~~ ~~2022~~ ~~2023~~ ~~2024~~ ~~2025~~ ~~2026~~ ~~2027~~ ~~2028~~ ~~2029~~ ~~2030~~ ~~2031~~ ~~2032~~ ~~2033~~ ~~2034~~ ~~2035~~ ~~2036~~ ~~2037~~ ~~2038~~ ~~2039~~ ~~2040~~ ~~2041~~ ~~2042~~ ~~2043~~ ~~2044~~ ~~2045~~ ~~2046~~ ~~2047~~ ~~2048~~ ~~2049~~ ~~2050~~ ~~2051~~ ~~2052~~ ~~2053~~ ~~2054~~ ~~2055~~ ~~2056~~ ~~2057~~ ~~2058~~ ~~2059~~ ~~2060~~ ~~2061~~ ~~2062~~ ~~2063~~ 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1. The first part of the document is a list of the names of the individuals who were involved in the project. The names are listed in alphabetical order. The names are: [illegible]

PETUKHOV, A.V., inzh.

Infinitely variable transmission in tractors. Mekh. i elek. sots.
sel'khoz. 16 no.4:20-22 '58. (MIRA 11:10)

1. Moskovskiy institut mekhanizatsii i elektrifikatsii sel'skogo
khozaystva.

(Tractors--Transmission devices)

PEYUKHOV, A.V.; CHESNOKOV, N.N.

Using laminated wood plastics in repairing equipment. Stan. i instr.
29 no.2:30-33 P '58. (MIRA 11:3)

(Laminated plastics)

PEKHOV, B.

Solar energy. WFO 2 no. 2:19-21 Mr '60.

(MIRA 13:6)

1. Zamestitel' predsedatelya seliosektzii Nauchno-tekhnicheskogo obshchestva energeticheskoy promyshlennosti.
(Solar energy)

PETUKHOV, B.

Once more on solar water heaters. NTO 2 no.7:58 JI '60.
(MIRA 13:7)

1. Predsedatel' geliotekhnicheskoy sekti Moskovskogo obla -
stnogo pravleniya Nauchno-tekhnicheskogo obshchestva energeti-
cheskoy promyshlennosti.
(Solar water heaters)

PETUKHOV, B., kand. tekhn. nauk

Using solar energy in collective farm production. Sel'. stroi. 9
no.3:22-24 My-Je '54. (MIRA 13:2)

1. Predsedatel' geliotekhnicheskoy seksii Moskovskogo otdeleniya
Vsesoyuznogo nauchnogo inzhenerno-tekhnicheskogo obshchestva energo-
tikov.

(Solar radiation)

PETUKHOV, Boris Fedorovich; TSYPKINA, F.L., red.; POPOV, N.D., tekhn.red.

[We are friends forever; notes about a trip to Czechoslovakia]
Druzhsba naveki; zametki o prebyvanii v Chekhslovakii. Moskva.
Izd-vo "Sovetskaya Rossiya," 1959. 61 p. (MIRA 13:3)

1. Predsedatel' Krasnodarskogo krayispolkoma (for Petukhov).
(Czechoslovakia--Description and travel)
(Czechoslovakia--Industries)

PLEKHANOV, P.S., inzh.; PETUKHOV, B.G., inzh; SAKHAROV, G.A., inzh.

Production of silicon steel plate. Izv.vys.ucheb.zav.; chern.met.
no.9:77-85 S '58. (MIRA 11:11)

1. Kuznetskiy metallurgicheskiy kombinat.
(Iron-silicon alloys) (Plates iron and steel)

AUTHOR: Petukhov, B.G. (Engineer). (Senior Research Engineer)

TITLE: Production of Chromium Structural Steel in 380 ton Open-Hearth Furnaces (Vyplavka khromistoy konstruktsionoy stali v 380-t martenovskikh peshakh). 130-3-6/22

PERIODICAL: "Metallurg" (Metallurgist), 1957, No.3, pp.11-14 (U.S.S.R.).

ABSTRACT. At present part of the output of 20X and 40X chromium steels is produced in 380 ton open hearth furnaces. In the present article details of this practice are given and are compared with that used for production of 190 ton furnaces. The charge consists of 62-68% hot metal 32-38% steel scrap, 10.6 - 12.3% iron ore and 4.2 - 5.9% limestone. The compositions of the steels are as follows: 40X - 0.35-0.42% C, 0.50-0.70% Mn, 0.21-0.33% Si and 0.90-1.03% Cr; 20X - 0.16-0.18% C, 0.50-0.64% Mn, 0.22-0.31% Si and 0.76-0.91% Cr. The details of the practice varied with the composition of the bath on melt down. Factors studied and for which comparison for the two sizes of the furnaces is made include metal composition at various stages, rate of decarburization at various stages, durations of the various stages of the process, total removal of deoxidizing elements and metal temperature. The general conclusion is that production of these types of steel in the larger furnaces is perfectly feasible and presents no special difficulties. No differences can be found in the mechanical properties of the metal produced in the two sizes of furnace and both have the satisfactory macrostructure. It has been calculated that for a monthly production in the

Card 1/2

PERIOD, P.A.

Director, U.S. Office of Naval Intelligence
Electronics Division

U.S. Dept. of Defense
Washington, D.C.

PETUKHOV, B., kand.tekhn.nauk

Sun rays through glass. Izobr. i ra's. no.1:16-17 Ja '62.

(MIRA 14-12,

1. Predsedatel' gelioseksii Nauchno-tehnicheskogo obshchestva
energetikov SSSR

(Solar energy)

S/133/60/000/010/001/013
A054/A029

AUTHORS Petukhov, B.G., Morokov P.K., - Engineers

TITLE Melting Chrome-Nickel Steels in Large-Capacity Open-Hearth Furnaces
Using Nickel Protoxide

PERIODICAL Stal', 1960, No 10, pp 892 - 896

TEXT: Substitution of nickel metal by nickel protoxide in 20 - 35-ton arc furnaces and 60-ton open-hearth furnaces established the fact that nickel protoxide could be used up to 97 - 98% of the total amount added, resulting in a saving of melting costs and a shortening of the melting time. With these results as a basis, tests were made with nickel protoxide when melting in 190-ton basic open-hearth furnaces 12XH3A (12KH₂N3A), 17XH2 (17KH₂N2), 20X2H4A (20KH₂N4A) and other type chrome-nickel structural steels with a minimum nickel content of 1.5%. Nickel protoxides were applied in 21 meltings in pelletized and in 12 meltings in powder form. They had the following characteristics

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S/133/60.000.01.001.01
A054/A029

Melting Chrome Nickel Steels in Large-Capacity Open-Hearth Furnaces Using Nickel Protoxides

	Pelletized Protoxides	Protoxides in Powder Form
Heat Stability, °C	1,800 - 1,850	1,840
Mechanical Strength, kg/cm ²	48 - 65	-
Porosity, %	28 - 36	-
Specific Weight, g/cm ³	7.1 - 7.3	-
Ni-Content, %	70 - 81	77 - 80
C-Content, %	10.6 - 19.5	18.3

✓

The nickel quantity obtained from the nickel protoxides, the nickel losses in slag, the reduction rate of nickel from the protoxides, their influence on the oxidation of C, Mn, P, the gas saturation and content of non-metallic inclusions in steel and the melting times were investigated. The charge consisted of 67% liquid pig iron, 37 - 33% scrap, 4.3 - 5.3% lime and 10.5 - 12.0% iron ore. It was found that nickel protoxides were reduced to nickel in open-hearth furnaces not only by carbon, phosphorus, manganese and iron, but above 230 - 250°C also by hydrogen and above 250 - 300°C by carbon monoxide. The reduction by the

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S/133/60/000/010/001/013
A054/A029

Melting Chrome-Nickel Steels in Large-Capacity Open-Hearth Furnaces Using Nickel Protoxides

latter above 700 - 800°C took place quickly and completely. By applying nickel protoxide a smaller quantity of iron ore had to be added to the charge and in spite of the increased amount of carbon during fusion, the melting time remained unchanged, for some types it was even shortened. The influence of nickel protoxide on the oxidation of the elements of the bath was examined with the aid of samples taken before adding NiO and 20 min after adding. It was established that Ni protoxide had a similar effect as iron ore, carbon, manganese and phosphorus oxidize intensively, while the sulfur content did not change. (1 ton of nickel protoxide oxidizes under the effect of 0.04 - 0.08% C). The analyses of samples taken from metal and slag during fusion and boiling showed that after the reduction of nickel from its protoxide, its concentration did not change, whereas hardly any nickel could be found in the slag (about 0.02%). It was, therefore, concluded, that the reduction of nickel from nickel protoxide took place instantaneously. The nickel yield of the pelletized substance was about 96.5 - 99.5%, while from nickel protoxide powder no more than 90 - 95% could be obtained. Nickel protoxide had no adverse effect on the macrostructure and the mechanical

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3/133/66/000/010/001/013
A054/A029

Melting Chrome-Nickel Steels in Large-Capacity Open-Hearth Furnaces Using Nickel Protoxides

properties of the steel, the gas content and that of non metallic inclusions was not increased. Savings as a result of the use of nickel protoxide work out at 55 rubles/ton for the 17KhN2, at 126 rubles/ton for the 12KhN3A, at 114 rubles/ton for the 20KhN3A and at 198 rubles/ton for the 20Kh2N4A type steel. There are 2 figures, 3 tables and 7 Soviet references.

V

Card 4/4

SHIROKOV, N.I.; PETUKHOV, B.G.

Deoxidation of rail steel by ferrotitanium and a reduced
amount of aluminum. Izv. vys. ucheb. zav.; chern. met.
5 no.10:42-49 '62. (MIRA 15:11)

1. Sibirskiy metallurgicheskiy institut i Kuznetskiy
metallurgicheskiy kombinat.
(Steel--Metallurgy) (Railroads--Rails)

PETUKHOV, B.G., inzh.; SHIROKOV, N.I., kand. tekhn. nauk.

Use of chromium-nickel chip for steel smelting in basic open
hearth furnaces. Trudy Sib. met. inst. no. 4:158-170 '57.

(Chromium-nickel steel--Metallurgy)

(MIRA 11:6)

SHIROKOV, N.I., kand.tekhn.nauk. PETUKHOV, B.G., inzh.; VEREMENKO, S.N., inzh.

Deoxidizing rail steel without aluminum or by replacing it with
calcium silicon. Izv. vys. ucheb. zav.; chern. metal no.1:41-54
Ja '58. (MIRA 11:5)

1.Sibirskiy metallurgicheskiy institut i Kuznetskiy metallurgicheskiy
kombinat.

(Steel--Metallurgy)
(Calcium-silicon alloy)

PETUKHOV, B.G.

Production and use of open-hearth sinter. Biol. TSNIICHM
no. 10:42-43 '58.

(MIRA 11:7)

1. Kuznetskiy metallurgicheskiy kombinat.
(Sintering)

SOV/137-58-7-14374

Translation from Referativnyy zhurnal, Metallurgiya, 1958, Nr 7, p 61 (USSR)

AUTHORS Petukhov, B.G., Shirokov, N.I.

TITLE Use of Chrome-nickel Swarf in Basic Open-hearth Steelmaking
(Ispol'zovaniye khromonikelevoy struzhki pri vyplavke stali v osnovnykh martenovskikh pechakh)

PERIODICAL Tr. Sibirsk. metallurg. in-ta, 1957, Nr 4, pp 158-170

ABSTRACT: A method has been developed for the reduction of Cr from Cr-Ni swarf charged into the open hearth after the dephosphorization period. Experimental heats (EH) were run at the Kuznetsk Metallurgical Kombinat in 190-t basic open hearths with basic roofs to smelt steel (St) of the following grades 40KhN, 20KhNZA, 12KhNZA, etc.. 15 to 30 min before the start of pure boil, 2-3 t charges of Cr-Ni swarf were added to the furnace, constituting 2.8-5.2% of the weight of the metal (Me) charge. The degree to which the Cr was recovered dropped as the weight of the added swarf was increased, it amounted to 33-90%. After addition of the swarf, (Cr_2O_3) amounted to $< 8\%$. No difference in the fluidity of this slag from others was noticeable. The steel of the EH did not differ in $[H]$, $[O]$, and mechanical

Card 1/2

Use of Chrome-nickel Swarf in Basic Open-hearth Steelmaking

SOV/137-58-7-14374

properties from the St smelted in the ordinary way. The quantity of nonmetallic inclusions in the Me of the EH was significantly higher in the course of the EH than in standard heats, but it became normal at the moment of deoxidation. The rate of C oxidation during the period of slag control and pure boil was lower by 0.03-0.05%. This is explained by the reduction in the temperature of the Me due to the addition of the swarf. The duration of the EH was increased by 20-25 min owing to the lengthening of the slag-control process and the reduction in the rate of C oxidation. When this method is used, little or no Fe-Cr need be added to alloy the Me.

1. Open hearth furnaces--Performance 2. Steel--Production 3. Chromium
-nickel alloys--Reduction 4. Chromium--Recovery M.K.

Card 2/2

SOV/137-58-10-20629

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 10, p 42 (USSR)

AUTHORS: Shirokov, N.I., Petukhov, B.G., Yeremenko, S.N.

TITLE. Deoxidation of Rail Steel Without Aluminum or With Replacement Thereof by Silico-calcium (Raskisleniye rel'sovoy stali bez alyuminiya ili s zamenoy yego silikoka'l'tsiyem)

PERIODICAL: Izv. vyssh. uchebn. zavedeniy. Chernaya metallurgiya, 1958, Nr 1, pp 41-54

ABSTRACT: To reduce the alumina-inclusions content of rail steel, this being one of the assumed causes of rail lamination, experimental heats of grade R50 steel were run in 380-t basic open-hearth furnaces without deoxidation of the Al in the ladle, and also with replacement of aluminum by Si-Ca. Determination was also made of [O] and of the stable nonmetallic inclusions (NI) in the liquid steel in the process of melting and pouring. It is established that the contents, composition, and quantity of stable NI in the steel during the period of pure boil undergo virtually no change and are not dependent upon the duration of the boil of the steel in the furnace. The NI and N content of the steel at the moment of its release from the furnace increases.

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SOV/137-58-10-20629

Deoxidation of Rail Steel Without Aluminum (cont.)

After deoxidation in the ladle in the ways indicated, [O] is the same as in standard Al deoxidation. In a ladle sample of the metal, the smallest amount of stable NI and the most favorable composition thereof (minimum Al_2O_3 contents) are found upon deoxidation with Si-Ca. The production of first-grade rails from this metal is lower with standard deoxidation than with the variants practiced in these experiments. The macroscopic structure of the rails improves upon deoxidation by Si-Ca in the ladle and is impaired upon deoxidation by Fe-Si alone. The quantity of stable NI in the finished rails declines relative to the ladle specimens of the metal both with the standard and with the experimental methods of deoxidation. The quantity of stable NI in the experimental steels is virtually identical in either procedure and is less than the content thereof in steels deoxidized in the ordinary way. In the experimental steels, the inclusions consist primarily of SiO_2 (50-65%), while in the standard heats the dominant component is Al_2O_3 (~ 60%). The total degree of contamination of rail metal deoxidized in the standard way and by the experimental procedures is virtually identical and is considerably greater than in ladle specimens due to sulfides and oxides and the appearance of sulfosilicates in the NI. Consecutive planings of the rail heads show that when aluminum is replaced by Si-Ca, the number of clear rails, excluding those showing NI in the form of scratches due to

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SOV/137-58-10-20629

Deoxidation of Rail Steel Without Aluminum (cont.)

reduction, is greatest, but the mean length of the scratches on one rail examined was also the greatest of any. Steel deoxidized by the experimental methods is of coarse granular structure (Nrs 2-4). Upon deoxidation by the experimental variants, σ_b increases (by 1.3-0.9 kg/mm²) and the plastic and resilience properties diminish δ is reduced by 0.6-0.3% and ψ by 2.1-1.4%. At the test temperature, +20°C and -40°C, a_k diminished by factors of 1.5 to 2. Owing to the impairment of these properties, the question of eliminating addition of Al or replacement thereof by Si-Ca will have to be solved after track-service testing of experimental rails.

V.M.

1. Steel--Processing
2. Steel--Properties
3. Steel--Impurities
4. Aluminum oxides--Determination

Card 3/3

S/130/60/000/010/002/003
A006/A001

AUTHORS: Petukhov, B. G., Morokov, P. K.

TITLE: Deoxidation and Alloying of Chromium Containing Steel With Silico-Chrome in the Ladle

PERIODICAL: Metallurg, 1960, No. 10, pp. 12-14

TEXT: In chrome-containing steel melting, ferrochrome is usually added to the pool after preliminary deoxidation. This method was however replaced at various plants by deoxidation and alloying of the steel in the ladle. Already in 1942, alloying of steel with chromium, by adding silicochrome into the ladle and the furnace pool was started at the Kuznetskiy metallurgicheskii kombinat, KMK, (Kuznetsk Metallurgical Combine). This method was developed by engineers A. I. Khomutov, V. Ye. Levkin, and P. A. Sakharuk. However, the insufficient heat charge of open-hearth furnaces and the lack of commercial silicochrome did at that time not permit the introduction of this deoxidation mode. The use of magnesite-chromite refractories for open-hearth furnace vaults makes it possible to heat the metal to a temperature which is required for its alloying and deoxidation in the ladle, and to obtain high-quality steel. In May - September

Card 1/3

S/130/60/000/010/002/003

A006/A001

Deoxidation and Alloying of Chromium Containing Steel With Silicochrome in the Ladle

1959, 60 experimental melts were made at KMK in 190-ton furnaces by melting chrome, chrome-nickel and chrome-silicon-manganese steels including 20X (20Kh), 40X (40Kh), 45 X (45Kh), 17X42(17KhN2), 40X4 (40KhN), and 15XCH4 (15KhSND) steel. For comparison the same steel grades were deoxidized by the conventional technology. "SiKhr 18" silicochrome, containing 18-20% Si, 48-50% Cr, 3-3.5% C and 0.05-0.07% P, was used for alloying and deoxidizing the metal in the ladle. The experimental and conventional melts differed only by the technology of deoxidizing and alloying the metal in the ladle. It was established that by introducing silicochrome into the ladle instead of ferrochrome Si, Cr and Mg loss was reduced, the components were uniformly distributed in the ladle, the properties of the metal were higher than required by GOST and did not differ from the properties of metal deoxidized by the conventional method. The internal structure was satisfactory and the metal had high mechanical properties. Flake sensitivity was not increased. As a result of reduced Si and Cr loss and consequently of a diminished consumption of ferrochrome and blast furnace ferro-

Card 2/3

S/130/60/000/010/002/003
A006/A001

Deoxidation and Alloying of Chromium Containing Steel With Silicochrome in the Ladle

silicon, the new method ensured an economical effect ranging between 11.9 and 18.2 rubles per ton for different steel grades. There are 3 tables.

ASSOCIATION: Kuznetskiy metallurgicheskiy kombinat (Kuznetsk Metallurgical Combine)

✓

Card 3/3

Experiment in smelting chrome-nickel steel with up to 1.50% chromium in the charge. P. K. Morozov and B. G. Petukhov (Mek. Spoinov, Kuznetsk. Metallurg. Inst., Novokuznetsk). Smelting of Cr-Ni steel with up to 1.50% Cr in the charge does not require the usual measures to prevent oxidation of the metal. The rate of oxidation during the melting is not high and losses of the metal as a result of increased Cr content in slag was not observed. In the high-temperature zone sufficient fluid motion in the slag is observed and therefore it is necessary to add lime instead of limestone to the furnace charge and the charge must be thoroughly heated during loading and before adding of iron. These precautions guarantee a partial dropping of initial slag by gravity flow. Mech. properties and macrostructure of exptl. heats of 20KhN3A (C 0.20-0.25, Mn 0.60-0.66, Cr 0.70-0.87, Ni 2.32-3.06%); and 12KhN3A (C 0.13-0.14, Mn 0.44-0.53, Cr 0.67-0.85, Ni 1.64-2.86%) as well as others were completely satisfactory. V. N. R.

KABANOV, V.F.; NESTERENKO, A.M.; PETUKHOV, B.G.

Production and use of sinter for open-hearth furnaces in the
Kuznetsk Metallurgical Combine. Izv. TSIOM no.1:36-38
'61. (FIL. 14:5)

1. Kuznetskiy metallurgicheskiy kombinat.
(Stalinsk--Sintering)

PETUKHOV, B.G.,

"About Rail Steel Contamination by Non-Metallic Inclusions and the Applicability of Aluminum For its Deoxidation,"
lecture given at the Fourth Conference on Steelmaking, A.A. Baikov Institute of Metallurgy, Moscow, July 1-6, 1957

137-58-6-11695

Translation from Referativnyi zhurnal Metallurgiya, 1958, Nr 6, p 18 (USSR)

AUTHORS Petukhov, B G Romanov P V

TITLE Production of 30KhGSA Steel to Higher Specifications as to Macrostructure and Mechanical Properties (Proizvodstvo stali 30KhGSA s povyshennymi trebovaniyami po makrostrukture i mekhanicheskim svoystvami)

PERIODICAL Sb. tr. Kuznetskogo mezhobsh. pravl. Nauchno-tekhn. obozr. chernoy metallurgii, 1956, Vol 1, pp 50-65

ABSTRACT

A description is offered of a smelting, pouring, and heat treatment procedure for 30KhGSA steel and of measures to eliminate rejects due to rectangular segregation, cracks, and mechanical properties. The steel was smelted in a basic 25-t open hearth using the scrap process and cold coke-oven gas. Deoxidation was by Si-Mn, Fe-Si, Al, and Si-Ca. Pouring was from the top directly from ladle to a 1340 kg ingot. Inspection was of rods rolled from the ingot. It was found that when the pouring temperature was increased rejects due to rectangular segregation dropped from 26.4 to 7.0%, but rejects due to cracks increased. To eliminate cracks, slower cooling of the

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137-58-6-11695

Production of 30KhGSA (cont.)

ingots in the mold was instituted. This was done by covering the pouring trough with a cover. The chemical composition of the steel, within the required limits, affected the mechanical properties. An increase in $[C]$, $[Si]$, and $[Cr]$ increases σ_B and diminishes a_k , while a rise in $[P]$ reduces σ_B and a_k . Optimum mechanical properties are obtained when $(C + Mn + Si + Cr) = 3.2-3.4\%$ and the following ratio obtains $C/(C + Mn + Si + Cr) \times 100 = 9.5\%$. It is observed that the tempering interval of temperatures established by Government Standard makes it possible to obtain satisfactory mechanical properties only when the steel contains 0.30-0.32%C, 0.95-1.0%Mn, 1.0-1.05%Si, and 0.95-1.0%Cr. The optimum conditions for heat treatment have been found to be the following: quenching from 890°C after holding for 40 min. in oil at 60-70°C; tempering at 510-520°C for 40 min. and cooling in cold oil.

V. N.

1. Steel--(containing 3.2-3.4% total alloying elements).
2. Steel--(containing 3.2-3.4% total alloying elements).
3. Steel--(containing 3.2-3.4% total alloying elements).
4. Steel--(containing 3.2-3.4% total alloying elements).

Card 2/2

PETUKHOV, B.G.; MOROKOV, P.K.

Trial use of open-hearth agglomerate. Metallurg 4 no.3:11-15
Mr '59. (MIRA 12:4)

1. Starshiy inzhener-issledovatel' Kuznetskogo metallurgicheskogo
kombinata (for Petukhov). 2. Nachal'nik martenovnogo tsekha No.1
Kuznetskogo metallurgicheskogo kombinata (for Morokov).
(Open-hearth process)

ET PETUKHOV, B.G.

Decarburization of rail steel with smaller amounts of aluminum
by V. N. Shirokov and B. G. Petukhov (Inst. Combustion
and Explosions, Moscow 1958, No. 1, 17-21). Three decar-
burization variations were tested in a 380-ton open-hearth fur-
nace on R-50 steel whose compn. before decarburization was
C 0.84-0.85, Mn 0.06-0.07, P 0.013-0.014, S 0.010%, H
4.98-5.20 cc./100 g., and 0.0023-0.0050% hard inclusions.
The slag compn. was FeO 9.2-10.7, Mn 2.37-2.49, P₂O₅
1.83-1.91%. The basicity varied between 1.72 and 2.92
and the fluidity was 122-48 mm. The pouring temp.
ranged 1530-1610° with the slag temp. 15-20° higher. In
variation I the steel was decarburized in the furnace only with
ferromanganese (11.7-13.0 kg./ton) and finished in the ladle
with 45% Al (297 g./ton). In variation II the steel was de-
carburized with 11.6-11.8 kg. ferromanganese/ton and 3.8-
9.8 kg. blast-furnace ferroaluminum/ton in the furnace and
finished in the ladle with 3.6-4.1 kg. 45% FeAl and 800 g.
Al/ton. In variation III 13.8 kg. ferromanganese/ton
was used in the furnace and 800 kg. 45% FeAl/ton in the
ladle. Variation I gave better phys. properties than III
and better plastic properties than II, but with somewhat
lower yield and tensile strengths. A saving of 26 kopecks/
ton resulted from the reduced amt. of Al used.

V. N. Bednareki

1/1 Distr: 4E2c

PETUKHOV, B. G.

Rational Method for the Preliminary Decarburization of Steel
 N. I. Shirokov, B. G. Petukhov and A. I. Borodulin. *ISIAR*,
 1988, (5), 416-422 (in Russian). Experiments on 380- and
 180-ton basic O.H. furnaces producing rail and other steels
 are described in which three methods of decarburization in the
 bath were compared. The use of blast-furnace ferro-silicon for
 preliminary decarburization was found to lead to loss of pro-
 ductivity, increases in the phosphorus and hydrogen contents
 of the steel, and increased cost. For rail steel the use of
 ferromanganese alone enabled productivity to be increased
 by 2-2.5% with improved metal quality and lowered costs.
 Similar advantages were obtained for low-carbon steel from
 the use of ferromanganese alone instead of silicomanganese
 and blast-furnace ferro-silicon and for medium carbon steel
 by using ferromanganese followed by addition of 45% ferro-
 silicon and aluminum in the ladle.

RB

finished in the same manner. The effect of these practices on slag and metal composition, on O and H content, on quality and kind of nonmetallic inclusions, on mechanical properties of steel, on yield, and economic aspects is closely examined. Decarburization with FeMn alone was found best by cutting decarburization time by 15 min., improving yield and mechanical properties of steel, and lowering costs. Coke-breeze treatment did not improve Mn recovery. J. D. Cal...

of

PETUKHOV, B.G., inzhener.

Smelting chromium structural steel in 380-ton open-hearth furnaces.
Metallurg 2 no.3:11-14 Mr '57. (MLBA 10:4)

1. Starshiy inzhener-issledovatel' Tsentral'noy laboratorii Kuznets-
kogo metallurgicheskogo kombinata.
(Open hearth furnaces) (Steel, Structural)

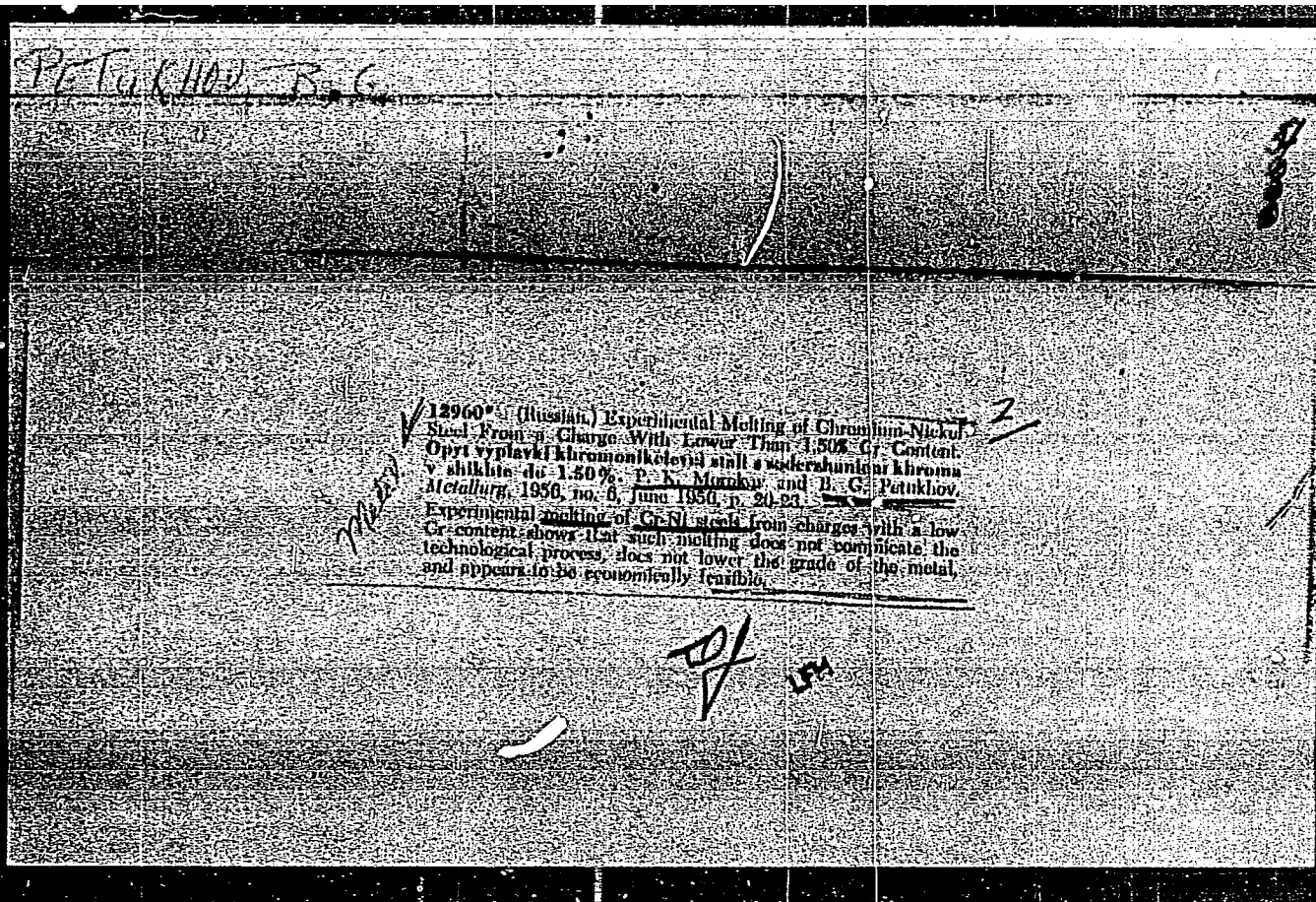
PETUKHOV, B. G.

1168. An Improved Method for Preliminary Decarboxylation of Steel. Rational'nyi sposob predvaritel'nogo razokhlazhdeniya stali. (Russian.) N. I. Shirokov, B. G. Petukhov, and A. I. Borodulin. Stal', v. 16, no. 5, May 1950, p. 415-422.

Preliminary decarboxylation of metal in the open hearth furnace with ferromanganese but without ferrosilicon improves efficiency of furnace and quality of metal, and reduces costs. Diagram, tables, graphs, 8 ref.

mt 3

of



PHASE I BOOK EXPLOITATION

SOV/5411

Konferentsiya po fiziko-khimicheskim osnovam proizvodstva stali. 5th,
Moscow, 1959.

Fiziko-khimicheskiye osnovy proizvodstva stali; trudy konferentsii
(Physicochemical Bases of Steel Making; Transactions of the
Fifth Conference on the Physicochemical Bases of Steelmaking)
Moscow, Metallurgizdat, 1961. 512 p. Errata slip inserted.
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Card 1/16

115

Physicochemical Bases of (Cont.)

SOV/5411

PURPOSE: This collection of articles is intended for engineers and technicians of metallurgical and machine-building plants, senior students of schools of higher education, staff members of design bureaus and planning institutes, and scientific research workers.

COVERAGE: The collection contains reports presented at the fifth annual convention devoted to the review of the physicochemical bases of the steelmaking process. These reports deal with problems of the mechanism and kinetics of reactions taking place in the molten metal in steelmaking furnaces. The following are also discussed: problems involved in the production of alloyed steel, the structure of the ingot, the mechanism of solidification, and the converter steelmaking process. The articles contain conclusions drawn from the results of experimental studies and are accompanied by references of which most are Soviet.

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Physicochemical Bases of (Cont.)

SOV/5411

Ladyzhenskiy, B. N., and M. V. Karakula. Making Low-Carbon Alloyed Steels in Acid Open-Hearth Furnaces 27

Stroganov, A. I., and A. N. Morozov. Behavior of Chromium in the Bath of a Basic Open-Hearth Furnace 39

Petukhov, B. G. Making Chromium-Nickel Steels in Large Open-Hearth Furnaces With the Use of Nickel Oxide 46

Omarov, A. K., and A. Ye. Khlebnikov. Intensifying the Working Period of the Open-Hearth Scrap Process 54

[The following persons participated in the research work:
Engineer Munasypova, Engineer T. Kovaleva, and Technicians
U. Rakhmanulov, V. V. Ponomareva, L. Rusnyak, Z. Zaporozhan,
A. Perkova, S. Biyalova, and V. Guseva.]

Card 4/16

SHIROKOV, N.I., kandidat tekhnicheskikh nauk; PETUKHOV, B.G., inzhener;
BORODULIE, A.I., inzhener.

Efficient method for the preliminary deoxidation of steel. Stal'
16 no.5:415-422 My '56. (MIRA 9:8)

1. Sibirskiy metallurgicheskiy institut i Kuznetskiy metallurgicheskiy kombinat.

(Open-hearth process)

PETUKHOV, B.G., inzhener; SHIROKOV, N.I., kandidat tekhnicheskikh nauk.

Smelting chromium steel from chrome iron ores. Stal.proizv.no.1:
5-22 '56. (MLRA 9:9)

1.Kuznetskiy metallurgicheskiy kombinat (for Petukhov). 2.Sibirskiy
metallurgicheskiy institut (for Shirokov).
(Chromium steel) (Smelting)

MOROZOV, P.K., inzhener; PETUKHOV, B.G., inzhener.

Smelting of chromium-nickel-steel having a 1.5 % chromium content in
the burden. Metallurg no.6:20-23 Je '56. (MLRA 9:9)

1. Ispolnyayushchiy obyazannosti nachal'nika martenovskogo tsekha
No.1 (for Morozov). 2. Starshiy inzhener-issledovatel' TsZL (for Petukhov).
3. Kuznetskiy metallurgicheskiy kombinat.
(Chromium-nickel-steel) (Magnitogorsk--Smelting)

PETUKHOV, B. G.

~~PETUKHOV, B. G.~~

Quality of chromium steel made in 380-ton open-hearth furnaces.
Metallurg 2 no.12:15-17 D '57. (MIRA 10:12)

1. Starshiy inzhener-issledovatel' Tsentral'noy laboratorii
Kuznetskogo metallurgicheskogo kombinata.
(Chromium steel)

SHIROKOV, N.I.; PETUKHOV, B.G.

Deoxygenation of rail steel by means of a reduced amount of aluminum.
(MIRA 11:1)
Metallurg 3 no.1:17-21 Ja '58.

1. Sibirskiy metallurgicheskiy institut i Kuznetskiy metallurgicheskiy kombinat.
(Steel--Metallurgy) (Oxidation-Reduction reaction)

Petukhov, B.G.

AUTHOR: Petukhov, B.G.

130-12-8/24

TITLE: Quality of Chromium Steel Melted in 380-ton Open-hearth
Furnaces (Kachestvo khromistoy stali, vyplavlenno v
380-T martenovskikh pechakh)

PERIODICAL: Metallurg, 1957, No.12, pp. 15 - 17 (USSR).

ABSTRACT: The author gives comparative data on the quality of
types 40X and 20X chromium steels melted in 190- and 380-ton
open-hearth furnaces (Table 1). The steels melted in the larger
furnaces were top-poured from a double-nozzle ladle directly
into 7-ton ingots. The unfavourable effect of this on the
surface quality of ingots and billets was compensated by improve-
ments in macrostructure. Determinations were also made of the
oxygen, hydrogen and non-metallic inclusions at each stage of
melting (Table 2), these being independent of the size of the
furnace. Thus, the general conclusion is that the use of the
larger furnace does not cause deterioration of the metal.
There are 2 tables.

ASSOCIATION: Kuznetsk Metallurgical Combine (Kuznetskiy metallurgi-
cheskiy kombinat)

AVAILABLE: Library of Congress
Card 1/1

Deoxidation of Rail Steel with a Reduced Quantity of Aluminium 130-1-10/17

(Kuznetskiy metallurgicheskiy kombinat)

AVAILABLE: Library of Congress
Card 3/3

SHIROKOV, N.I., kand.tekhn.nauk, dotsent; PETUKHOV, B.G., inzh.; YEREMENKO
S.N., inzh.

Effect of the method of introducing aluminum into the metal
on the quality of rail steel. Izv.vys.ucheb.zav.; chern.met.
no.6:29-34 Je '58. (MIRA 12:8)

1. Sibirskiy metallurgicheskiy institut i Kuznetskiy metallurgi-
cheskiy kombinat. Rekomendovano kafedroy metallurgii stali
Sibirskogo metallurgicheskogo instituta.
(Steel--Metallurgy) (Railroads--Rails)

PETUKHOV, B. G. and MOROKOV, I. K.

Primeneniye zakisi nikelya v bol'shekruglykh martenovskikh pri vy-
plavke khromonikelevykh staley.

report submitted for the 5th Biannual Chemical Conference on Steel Production,
Moscow, 30 Jun 1959.

PETUKHOVA, G.N.; PETUKHOV, B.N.; POLEZHAYEV, Ye.F.

Effect of aminazin on reflex activities of varied complexity.
Zhur.nevr.i psikh 60 no.8:994-1001 '60. (MIRA 13:9)

1. Kafedra klinicheskoy i eksperimental'noy fiziologii (sav. - prof.
V.V. Parin) Tsentral'nogo instituta usovershenstvovaniya vrachey,
Moskva.

(CHLORPROMAZINE)

(REFLEXES)

PETUKHOV, B.; KAMIONSKIY, L.

Using solar reflectors in medicine. MTO 3 no.4:55 A: '61.
(MIRA 14:3)

1. Predsedatel' gelioseksii Moskovskogo oblastnogo pravleniya Nauchno-tekhnicheskogo obshchestva energetikov (for Petukhov).
2. Starshiy inzh. Vsesoyuznogo soveta nauchno-tekhnicheskikh obshchestv (for Kamionskiy).
(Sun baths)

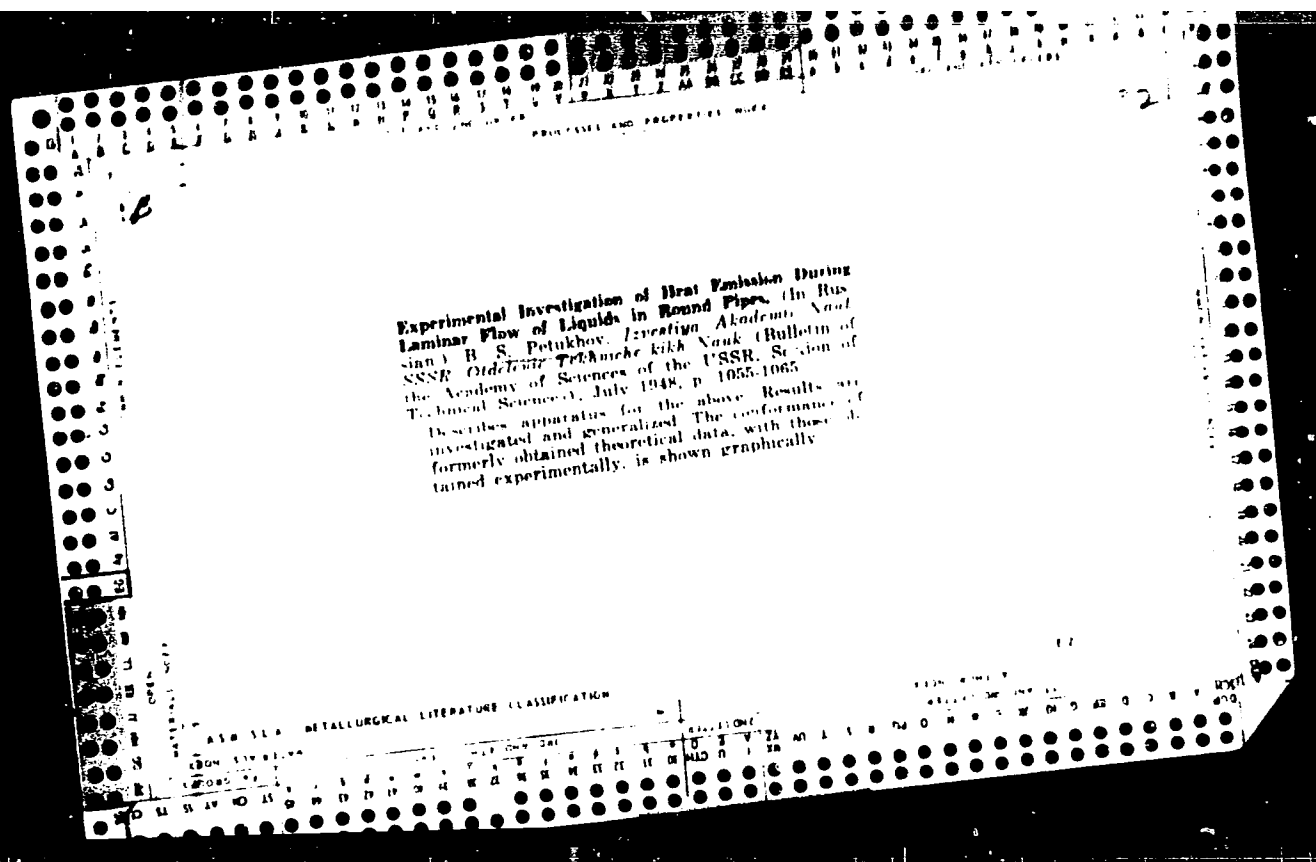
PETUKHOV, A.V., assistant

Results obtained from investigating the performance of tractor-drawn
units with infinitely variable transmission. Trudy MIMESKH 6:29-46
'59. (MIRA 14:5)

(Tractors—Transmission devices)

PETUKHOV, Aleksandr Vikent'yevich; CHESNOKOV, Nikolay Nikolayevich;
POSTERNYAK, Ye.F., red.inzh.; FREGER, D.P., tekhn.red.

[Use of laminated plastics for the repair of metal cutting equipment; practice of the V.I.Lenin Machinery Plant in Leningrad]
Primenenie drevesno-sloistykh plastikov pri remonte metallo-rezhushchikh stankov; opyt mashinostroitel'nogo zavoda imeni V.I.Lenina v Leningrade. Leningrad, 1956. 17 p. (Leningradskii dom nauchno-tekhnicheskoi propagandy. Informatsionno-tekhnicheskii listok, no.16. Modernizatsiia i remont oborudovaniia) (MIRA 10:12)
(Milling machines--Maintenance and repair)
(Laminated plastics)



PETUKHOV, B.

PHASE I

TREASURE ISLAND BIBLIOGRAPHICAL REPORT

AID 309 - I

BOOK

Call No.: QC323.P47

Author: PETUKHOV, B. S.

Full Title: EXPERIMENTAL STUDY OF HEAT TRANSMISSION

Transliterated Title: Opytnoye izucheniye protsessov teploperedachi

Publishing Data

Originating Agency: None

Publishing House: State Energetics Publishing House

Date: 1952

No. pp.: 344

No. of copies: 5,000

Editorial Staff

Editor: Mikheyev, M. A., Corr.

Tech. Ed.: None

Member, Acad. of Sci.

Editor-in-Chief: None

Appraiser: None

Others: Voskresenskiy, K. D.

Text Data

Coverage: The book contains a systematic presentation of theories, methods and techniques of experimental studies of heat transmission. The basic heat-measuring devices and apparatuses are described. The thermal processes, such as heat conduction, convection, and radiation, are analytically formulated with Fourier's equation and criteria Bio's and Fourier's and also with differential equations

• Opytnoye izucheniye protsessov teploperedachi

AID 309 - I

simplified with criteria of Peclet (Pe), Grashof (Gr), Prandtl (Pr), Nusselt (Nu), Reynold's (Re) and others. Theory of dimensional and operational similarity is applied for the development of experimental models for the study of practical installations.

The book, unlike many conventional American textbooks, is written with a mathematical approach to the problems of heat transmission.

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Tube method.	88

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Opytnoye izucheniye protsessov teploperedachi

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Opytnoye izucheniye protsessov teploperedachi	AID 309 - I
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PETUKHOV, B.; RAGULIN, N.

Determination of heat conductivity of aqueous solutions of monoethanolamine
by the method of regular regime. Kholodil'naya Tekh. 30, No.1, 56-9 '53.
(CA 47 no.20:10326 '53) (MLRA 6:3)

1. V.M.Molotov Energetics Inst., Moscow.

РЕТУКHOV, B.S.

ACHERKAN, N.S., doktor tekhnicheskikh nauk, professor, glavnyy redaktor;
 ANTSYFEROV, M.S., kandidat fiziko-matematicheskikh nauk; ASTAKHOV, K.V.,
 professor; VUKALOVICH, M.P., professor, doktor tekhnicheskikh nauk;
 KOROLIN, A.I., kandidat tekhnicheskikh nauk; KRIPETS, E.S., inzhener;
 LAZAREV, I.P., kandidat tekhnicheskikh nauk; MAZYRIN, I.V., inzhener;
 MATYUKHIN, V.M., kandidat tekhnicheskikh nauk; NIKITIN, N.N., kandidat
 fiziko-matematicheskikh nauk; PANICHKIN, I.A., kandidat tekhnicheskikh
 nauk; ~~РЕТУКHOV, B.S.~~, kandidat tekhnicheskikh nauk; PODVIDZ, L.G.,
 kandidat tekhnicheskikh nauk; SIMONOV, A.F., inzhener; SMIRYAGIN, A.P.,
 kandidat tekhnicheskikh nauk; FAYNZIL'BER, E.M., professor, doktor
 tekhnicheskikh nauk; KHALIZEV, G.P., kandidat tekhnicheskikh nauk;
 YAN'SHIN, B.I., kandidat tekhnicheskikh nauk; MARKUS, M.Ye., inzhener,
 redaktor; KARGANOV, V.G., redaktor graficheskikh materialov, inzhener;
 SOKOLOVA, T.F., tekhnicheskiiy redaktor.

[A machinebuilder's manual in six volumes] Spravochnik mashinostroitel'ia
 v shesti tomakh. Izd. 2-e, ispr. i dop. Moskva, Gos. nauchno-tekhn.
 izd-vo mashinostroit. lit-ry, Vol. 2. 1954. 559 p. (MIRA 8:1)
 (Machinery--Construction) (Mechanical engineering)

Petukhov, B. S.

Heat transfer in viscous liquids flowing in rectangular channels and in pipes. B. S. Petukhov and B. A. Krasovskiy. *Izvest. Akad. Nauk S.S.S.R. Otdel. Tekh. Nauk* 1953, 806-81(1953); *Chem.-Eng.-Tech.* 26, 309-11(1954). Heat-transfer expt. in heating and cooling were made with a transformer oil and a high-viscosity oil. A total of 100 expt. values were obtained with 127 in laminar flow. The results could be correlated by means of a modified Sieder and Tate (C.A. 31, 777) equation so that straight lines on log-log plots were obtained over the range covered. Graphs for heating and for cooling are presented.

Karl Kammermeyer

ПЕТУКHOV, B.S.

Local Heat Emission of a Plate
in a Turbulent Subsonic Air Flow

Zh. tekhn. Fiz.
24, (10), 1761-1772
1954

B.S. Petukhov, A.A. Detlaf,
V.V. Krasov

U.S.S.R.

A method is described enabling the study of local heat emission of cylindrical bodies in a gaseous turbulent flow of high velocity. Local heat emission of a plate placed in the direction of the flow was experimentally studied for Re up to 2,000,000 and M up to 0.8. Formulae are given for the calculation of the local and mean heat emission of a plate placed longitudinally in a gaseous flow. (Bibl. 8)

PETUKHOV BORIS SERGEYEVICH

PETUKHOV, Boris Sergeyevich

PETUKHOV, Boris Sergeyevich, Academic Degree of Doctor of Technical Sciences, based on his defense, 30 June 1955, in the Council of the Moscow Order of Lenin Power Engineering Institute Molotov, of his dissertation entitled: "Research in the heat exchange and hydraulic resistance of non-isothermal flow of liquids in pipes." For the Academic Degree of Doctor of Sciences.

SC: Bulletin' Ministerstva, Vysshego Obrazovaniya SSSR, List No 20, 8 October 1955, Decision of Higher Certification Commission Concerning Academic Degrees and Titles.

PETUKHOV, B.S., kandidat tekhnicheskikh nauk, dotsent; KRASNOSHCHENKOV, Ye.A.,
kandidat tekhnicheskikh nauk, assistant; NOL'DE, L.D., kandidat tekhnicheskikh nauk.

Investigation of local heat transfer during viscous flow of a liquid
in a round tube. Trudy MEI no.25:27-50 '55. (MLRA 9:7)
(Heat--Transmission) (Fluids)

Subject : USSR/Engineering AID P - 5105
Card 1/1 Pub 1956 - 0125
Author : Petukhov, B. S. Eng. Tech. Sci.
Title : Method of the thick walled pipe for measuring the heat transfer in pipes
Periodical : Teploenergetika, 10, 35-41, 0 1956
Abstract : The author examines the theory and practice of the method for measuring the heat transfer in pipes with a flowing liquid. This method is based on the measurement of the temperature drop in the wall of a thick-walled pipe. The results of the experimental testing of this method are presented. 5 diagrams.
Institution : Moscow Power Institute
Submitted : No date

PETUKHOV, B.S., doktor tekhnicheskikh nauk; NOL'DE, L.D., kandidat tekhnicheskikh nauk; KRASNOSHCHEKOV, Ye.A., kandidat tekhnicheskikh nauk.

Heat transfer during viscous flow of fluids in tubes and channels. Teploenergetika 3 no.12:41-47 D '56. (MLRA 9:12)

1. Moskovskiy energeticheskiy institut.
(Fluid dynamics) (Heat--Transmission)

PETUKHOV, B. S. (Doctor of Technical Sciences)

Moscow. Energeticheskiy institut

Istoriya energeticheskoy tekhniki SSSR v trekh tomakh. t. 1: Teplo tekhnika
(History of Power Engineering in the USSR in Three Volumes. v. 1: Heat Engineering)
Moscow, Gosenergoizdat, 1957. 179 p. 5,000 copies printed.

Ed.-Compiler: Konfederatov, I.Ya., Doctor of Technical Sciences; Authors: Badyl'kes, I.S., Doctor of Technical Sciences; Belinskiy, B.Ya., Candidate of Technical Sciences; Gimmel'farb, M.L., Candidate of Technical Sciences; Kalafati, B.D., Candidate of Technical Sciences; Kertselli, L.I., Professor; Kovalev, A.I., Doctor of Technical Sciences; Konfederatov, I.Ya., Doctor of Technical Sciences; Lavrov, V.A., Doctor of Technical Sciences; Lebedev, I.D., Doctor of Technical Sciences; Lukinskiy, V.V., Doctor of Technical Sciences (deceased); Petukhov, B.S., Doctor of Technical Sciences; Sazanovskiy, A.Ye., Doctor of Technical Sciences; Semenenko, N.A., Doctor of Technical Sciences; Smel'nitskiy, S.G., Candidate of Technical Sciences; Sokolov, Ye.Ya., Doctor of Technical Sciences; Chistyakov, S.F., Candidate of Technical Sciences, and Shcheglyayev, A.V., Corresponding Member, USSR Academy of Sciences; Editorial board of set: Bel'kind, L.D., Doctor of Technical Sciences; Glazunov, Doctor of Technical Sciences; Golubtsova, V.A., Doctor of Technical Sciences; Zolotarev, T.L., Doctor of Technical Sciences; Izbash, S.V., Doctor of Technical Sciences; Kirillin, V.A., Corresponding Member, USSR Academy of Sciences;

Konfederatov, I.Ya., Doctor of Technical Sciences; Margulova, T.Kh., Doctor of Technical Sciences; Meshkov, V.V., Doctor of Technical Sciences; Petrov, G.I., Doctor of Technical Sciences; Sirotinskiy, L.I., Doctor of Technical Sciences; Styrikovich, M.A., Corresponding Member, USSR Academy of Sciences; and Zhuravskiy, Ya.A., Candidate of Technical Sciences. Ed.: Matveyev, G.A., Doctor of Technical Sciences; Technical Ed.: Medvedev, L.Ya.

PURPOSE: The book is intended for technicians in all branches of heat engineering.

COVERAGE: This book presents the development of the basic branches of heat engineering in the Soviet Union and it is the first volume of 3 volumes entitled history of Power Technology in the USSR. The first chapter gives a concise history of the development of heat engineering from its very beginning to the middle of the 19th Century when the fundamentals of the theoretical heat engineering were established. A detailed description of the development of heat engineering in pre-revolutionary Russia is given in Ch. 2 to 5 and its status before 1917 is described. In the main part of the volume, Ch. 6 to 16, the development of various branches of the Soviet heat engineering is presented. The theoretical fundamentals of heat engineering, of manufacturing boilers, turbine installations of heat power plants, district heating, heat control, automation of thermal processes, and cooling techniques are covered extensively. Each chapter is supplemented with a bibliography. The book is illustrated with photographs, charts and diagrams, worked out by the authors of the respective chapters. At the end of the book there is a chronological list of significant events in the development of heat engineering.

ACCESSION NR: AP4024193

S/0294/64/000/001/0078/0081

AUTHORS: Petukhov, B. S.; Royzen, L. I.

TITLE: Generalized equations for heat transfer in turbulent gas flow in tubes with annular cross section

SOURCE: Teplofizika vy*sokikh temperatur, no. 1, 1964, 78-81

TOPIC TAGS: heat transfer, turbulent gas flow, annular cross section tube, Nusselt number, Reynolds number, heat transfer coefficient, adiabatic temperature, unilateral heating

ABSTRACT: This is a continuation of an earlier investigation (Teplofizika vy*sokikh temperatur v. 1, no. 3, 1963). The most reliable experimental data obtained in this investigation (the reliability being ascertained by comparison with other data) are used to derive equations for the heat-transfer coefficients and the adiabatic temperatures of the walls of the annular tubes. The empirical

Cord 1/4

ACCESSION NR: AP4024193

formulas derived are:

$$Nu_{rp, \infty} = 0,0188 Re^{0,8}, \quad (1)$$

$$\frac{Nu_{1H, \infty}}{Nu_{rp, \infty}} = 0,88 (d_1 / d_2)^{-0,18} \zeta, \quad (2)$$

$$\frac{Nu_{2H, \infty}}{Nu_{rp, \infty}} = 1 - 0,14 (d_1 / d_2)^{0,8}, \quad (3)$$

where Nu -- Nusselt number, Re -- Reynolds number, the subscripts 1 and 2 pertain to the inside and outside tube diameters, the subscripts 1H and 2H denote that Nu_∞ pertains to the inside wall with the outside wall insulated and vice versa, and the subscript ∞ pertains to a round tube without an insert. ζ is a correction which takes into account the fact that the exponent of Re may be smaller than 0.8, and has a value

Card 2/4

ACCESSION NR: AP4024193

$$\zeta = 1 + 7.5 \left(\frac{d_2/d_1 - 5}{Re} \right)^{0.8} \text{ for } d_1/d_2 < 0.2;$$

$$\zeta = 1 \text{ for } d_1/d_2 \geq 0.2.$$

The empirical formulas for the limiting adiabatic wall temperatures $\theta_{1\infty}$ and $\theta_{2\infty}$ are

$$\theta_{1\infty} = 32.0[0.16(d_1/d_2)^2 - 1] Re^{-0.8}, \quad (4)$$

$$\theta_{2\infty} = \theta_{1\infty} \cdot d_1/d_2 \quad (5)$$

This set of equations makes it possible to calculate the heat transfer and the adiabatic temperatures of the walls for unilateral heating (internal or external). It is claimed that, compared with the presently derived formulas, the published data yield values that range from 50% to 300 or 400% of the true ones. Orig. art. has: 3 figures and 5 formulas.

Card 3/4

ACCESSION NR: AP4024193

ASSOCIATION: Moskovskiy energeticheskiy institut (Moscow Power Engineering Institute)

SUBMITTED: 10Dec63

DATE ACQ: 16Apr64

ENCL: 00

SUB CODE: PH

NR REF SOV: 004

OTHER: 005

Cord 4/4

BADYL'KES, I.S., doktor tekhnicheskikh nauk; BELINSKIY, S.Ya., kandidat tekhnicheskikh nauk; GIMMEL'FARB, M.L., kandidat tekhnicheskikh nauk; KALAFATI, D.D., kandidat tekhnicheskikh nauk; KERTSELLI, L.I., professor; KOVALEV, A.P., doktor tekhnicheskikh nauk; KONFEDERATOV, I.YA., doktor tekhnicheskikh nauk; LAVROV, V.N., doktor tekhnicheskikh nauk; LEBEDEV, P.D., doktor tekhnicheskikh nauk; LUKNITSKIY, V.V., doktor tekhnicheskikh nauk [deceased]; PETUKHOV, B.S., doktor tekhnicheskikh nauk; SATANOVSKIY, A.Ye., kandidat tekhnicheskikh nauk; SEMENENKO, N.A., doktor tekhnicheskikh nauk; SMEL'NITSKIY, S.G., kandidat tekhnicheskikh nauk; SOKOLOV, Ye.Ya., doktor tekhnicheskikh nauk; CHISTYAYOV, S.F., kandidat tekhnicheskikh nauk; SHCHEGLYAYEV, A.V.; BEL'KIND, L.D., doktor tekhnicheskikh nauk, redaktor; GLAZUNOV, A.A., doktor tekhnicheskikh nauk, redaktor; ZOLOTAREV, T.L., doktor tekhnicheskikh nauk, redaktor; IZBASH, S.V., doktor tekhnicheskikh nauk, redaktor; KIRILLIN, V.A., redaktor; MARGULOVA, T.Kh., doktor tekhnicheskikh nauk, redaktor; MESHKOV, V.V., doktor tekhnicheskikh nauk, redaktor; PETROV, G.N., doktor tekhnicheskikh nauk, redaktor; SIROTINSKIY, L.I., doktor tekhnicheskikh nauk, redaktor; STIRIKOVICH, M.A., redaktor; SHNEYBERG, Ye.A., kandidat tekhnicheskikh nauk, redaktor; MATVEYEV, G.A., doktor tekhnicheskikh nauk, redaktor; MEDVEDEV, L.Ya., tekhnicheskiiy redaktor

[History of power engineering in the U.S.S.R.: in three volumes]
Istoriia energeticheskoy tekhniki SSSR: v trekh tomakh. Moskva,
Gos.energ.izd-vo.

(Continued on next card)

. BADYL'KES, I.S.---(continued) Card 2.

Vol. 1. [Heat engineering] Teploekhnika. Avtoraki kolektiv toma
Badyl'kes i dr. Red. -sost. toma I. I. A. Konfederatov. 1957. 479 p.

(MIRA 10:8)

1. Chlen-korrespondent Akademii nauk SSSR (for Shcheglyayev,
Kirillin, Styrikovich). 2. Moscow. Moskovskiy energeticheskiy
institut

(Heat engineering--History)

PETUKHOV, B. S.

"Investigating the Resistance of Friction and the Coefficient of Wall Temperature Restoration During the Motion of a Gas Through a Circular Pipe at a High Subsonic Speed," by Doctor of Technical Sciences B. S. Petukhov, Candidate of Technical Sciences A. S. Sukomel and Engr V. S. Protopopov, Moscow Power Engineering Institute, Teploenergetika, No 3, Mar 57, pp 31-37

The article describes the method of investigating the resistance of friction and the coefficient of wall temperature restoration during the flow of air through a round tube at a high subsonic speed.

The authors present data on the coefficients of resistance and the restoration of temperature during stabilized motion and in the initial portion of the tube in a turbulent boundary layer.

S-1M:305

AUTHOR: PETUKHOV, B.S., MUCHNIK, G.F. PA - 3565
 TITLE: On the Hydraulic Resistance in the Case of Turbulent Noniso-
 thermal Movement of Liquids in Tubes. (K voprosu o gidravliches-
 kom soprotivlenii pri turbulentnom neizotermicheskom dvizhenii
 zhidkosti v trubakh, Russian)
 PERIODICAL: Zhurnal Tekhn. Fiz., 1957, Vol 27, Nr 5, pp 1095 - 1099 (U.S.S.R.)
 ABSTRACT: The formulae available showed contradictory results, and experimental
 data comprise the modifications of the physical characteristic
 values only within narrow limits. For this reason the department
 for theoretical bases of heat technology at the Moscow Institute
 for Energetics carried out new tests for the measurement of the
 hydraulic resistance in round tubes in the case of the motion of
 two oils (MS- and transformer oil) and water under conditions
 marked by an essential modification of viscosity with temperature.
 The experiments were carried out in such a manner that the in-
 fluence of input effects was excluded. It was shown that with
 cooling of the liquid (in contrast to its heating) the exponent
 n and therefore also ξ depends essentially on Pr_F . Further analysis
 showed that the relation can be expressed by

$$n = 0.28 Pr_F^{-\frac{1}{4}}$$

For the resistance coefficient in the case of a turbulent non-

Card 1/2

VORONIN, Grigoriy Ivanovich, prof. dokt.tekhn.nauk., VUKALOVICH, M.P., prof.
dokt.tekhn.nauk, retsenzent.; ~~PIPIUKHON~~, B.S., prof., dokt.tekhn.nauk,
retsenzent.; ZUBAREV, V.N., dots., kand.tekhn.nauk, retsenzent.; ISACHENKO,
V.P., dots., kand.tekhn.nauk, retsenzent.; BASSKAZOV, D.S., inzh., red.;
PETROVA, I.A., izd.red.; PUKHLIKOVA, N.A., tekhn.red.

[Principles of thermodynamics and heat transfer] Osnovy termodinamiki
i teploperedachi. Moskva, Gos. izd-vo obor., promyshl., 1958. 341 p.
(MIRA 11:9)

(Thermodynamics)
(Heat--Transmission)

KIRILLOV, V.V.; PETUKHOV, B.S.

Studying the heat exchange during a turbulent high-speed gas flow
in pipes. Nauch. dokl. vys. shkoly; energ. no.1:155-160 '58.
(MIRA 11:10)

1.Rekomendovano kafedroy TOT Moskovskogo energeticheskogo instituta.
(Heat exchangers) (Aerodynamics)

PETUKHOV, B.S., doktor tekhn. nauk, prof.; SUKOMEL, A.S., kand. tekhn.
nauk; MUKHIN, V.A., inzh.

Investigation of the temperature recovery factor during flow of
a compressible gas in a circular tube. Izv. vys.ucheb. zav.;
energ. no. 2:51-57 P '58. (MIRA 11:7)

1. Moskovskiy ordena Lenina energeticheskiy institut.
(Aerodynamics, Supersonic)

1958-12/14

AUTHORS: Petukhov, B. S., Dr.Tech.Sc. and Kirillov, V.V., Eng.

TITLE: Concerning heat exchange during the turbulent flow of liquids in pipes. (K voprosu o teploobmene pri turbulentnom techenii zhidkosti v trubakh).

PERIODICAL: Teploenergetika, 1958, No.4, pp. 63-6 (180).

ABSTRACT: Most published works on the semi-empirical theory of heat-exchange regard the flow of liquid in a tube consisting of two or three layers. A velocity distribution law or impulse exchange law is selected for each of the layers. This very rough representation often leads to considerable differences between theory and experiment when Prandtl's number is greater than 10 - 20. The present article gives a theoretical calculation of heat-exchange during turbulent flow of a liquid in tubes, basing the calculation on an equation derived by Reichardt for the change of velocity across the section of the tube. This equation is well-verified theoretically and fully verified experimentally. An equation for the coefficient of turbulent exchange and impulse associated with the velocity distribution equation is given. A theoretical calculation of the rate of heat-exchange during turbulent flow in tubes of a liquid of constant physical properties. Approx.

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Concerning heat exchange during the turbulent flow of liquids in pipes.

that cannot be integrated analytically; are integrated numerically; hence Nusselt's number is expressed as functions of Reynolds' and Prandtl's numbers in Tables 1 and 2. Calculated results for Prandtl's number greater than 0.71 are compared in Fig. 2 with Karman's theoretical formula and Mikheyev's empirical formula. Over the range of Prandtl's number greater than 0.71 less than 10 the calculated values are within 7% of those given by Karman's formula. However, at higher Prandtl numbers Karman's curves are lower and when Prandtl's number is 20 they are almost horizontal. Analysis of the results shows that for calculations of heat exchange during turbulent flow in pipes it is best to use the equation for the coefficient of turbulent exchange of impulse. Fig. 3 gives the relationship between Nusselt's and Prandtl's number when the latter lies between 0.001 and 0.1 and Reynolds' number lies between 10^4 and 10^5 . The majority of investigations on heat-exchange during turbulent flow of liquids in pipes has been made over quite a narrow range of Prandtl numbers for small temperature heads, when changes in the physical properties

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of the liquid are insignificant. Heat-transfer measurements were therefore undertaken using water, transformer oil and oil Grade MC under conditions in which there is a considerable change in viscosity with temperature. Other physical properties were also changed but over narrower limits. The characteristics of the experimental data thus obtained and also those of Kreith and Summerfield, which are referred to later, are given in Table 3. The results of the tests for two oils and water are plotted in Fig.4. The experimental points agree well with one another and give a smooth curve in the ordinates used; the scatter of the test points being no more than 10-15%. The results presented in Fig.4 show that theoretical calculations correctly represent the relationship between the Nusselt, Reynolds and Prandtl numbers not only when the physical properties are constant but also when there is a considerable change in viscosity with temperature. A new design formula is offered on the basis of the tests and theoretical calculations. It is valid for values of Reynolds number from 10^4 to 10^6 and for Prandtl's Card 3/4 number from 0.7 to 200. Existing empirical formulae are

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adequate only over a much narrower range than the formulae proposed here.

There are 4 figures and 18 references - 3 German, 2 English, 6 Russian.

ASSOCIATION: Moscow Power Institute.
(Moskovskiy Energeticheskii Institut).

AVAILABLE: Library of Congress.

Card 4/4

AUTHORS: Petukhov, B. S., Krasnoshchekov, Ye. A. 57-28-6-15/34

TITLE: Hydraulic Resistance in the Case of a Viscous Motion of a Liquid in Tubes (Gidravlicheskiye Sprotivleniya pri vyazkostnom neizotermicheskom dvizhenii zhidkosti v trubakh)

PERIODICAL: Zhurnal Tekhnicheskoy Fiziki, 1958, Vol. 28, Nr 6, pp. 1207 - 1214 (USSR)

ABSTRACT: The well-known formulae for the resistance coefficient in the case of an isothermal motion of a liquid in tubes are not valid for the purpose of determining hydraulic resistance during heat exchange. Especially great differences of the values of resistance coefficients are observed in a viscous (laminary) flow. The experimental data available do not suffice for the determination of the dependence ξ on $\frac{\mu_s}{\mu_{zh}}$, Pe and $\frac{1}{d}$ within the range of variability. In connection herewith the authors measured the hydraulic resistance in the viscous flow of oil in round and rectangular tube. Besides the authors, also L. D. Mol'de took part in the experiments. The method of entering corrections on the hydrodynamical initial section assumed when calculating

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ξ is justified only in the case of an isothermal motion of the liquid. The working out of experimental data showed that the correction in the initial section is more simple and makes it possible to obtain more universal dependences of the resistance coefficient. The dependences ξ on Re in the case of a motion of the liquid in round and rectangular tubes are shown (figures 1 and 2). The diagrams show that, with Re and Pe being equal, the resistance coefficient increases with an increase of the value μ_2/μ_1 . In the case of liquids capable of forming drops viscosity is subjected to the greatest changes, with temperature, at standard conditions. Other physical parameters depend only little on temperature. The change of viscosity must, compared to other parameters, exercise the greatest influence on ξ . The joint elaboration of experimental data for round and rectangular tubes shows that in the case of a non-isothermal motion of the liquid, the dependence of the resistance coefficient on the shape of the cross section takes the same course as in the case of an isothermal motion. In consideration of what has been said the generalized dependence of the resistance

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coefficient can be represented in form of the equation

$$\xi Rr_1 = 64 \varphi \left(\frac{\mu s.}{\mu_1} \right)^n .$$

The resistance coefficient depends in a high degree not only on $\frac{\mu s.}{\mu_1}$, but also on $Pe_1 \frac{d}{l}$ (figure 4). On this occasion the effect produced by $\frac{\mu s.}{\mu_1}$ on the amount ξ decreases with an increase of $Pe_1 \frac{d}{l}$. There are 4 figures, 1 table and 5 references, 4 of which are Soviet.

ASSOCIATION: Moskovskiy energeticheskiy institut (Moscow Institute of Power Engineering)

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1. Oil—Viscosity 2. Fluid flow—Resistance 3. Fluid flow—
Test equipment 4. Mathematics